Part E: Evolutionary Computation - DTU Orbit (08/11/2017)

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Part E, Evolutionary Computation, edited by Professors Frank Neumann, Carsten Witt, Peter Merz, Carlos A. Coello Coello, Oliver Schütze, Thomas Bartz-Beielstein, Jörn Mehnen, and Günther Raidl, concerns the third fundamental element of what is traditionally being considered to be the core of Computational Intelligence.

First, comprehensive surveys of genetic algorithms, genetic programming, evolution strategies, parallel evolutionary algorithms are presented, which are readable and constructive so that a large audience might find them useful and – to some extent – ready to use. Some more general topics like the estimation of distribution algorithms, indicator-based selection, etc., are also discussed.

An important problem, from a theoretical and practical point of view, of learning classifier systems is presented in depth.

Multiobjective evolutionary algorithms, which constitute one of the most important group, both from the theoretical and applied points of view, are discussed in detail, followed by an account of parallel multiobjective evolutionary algorithms, and then a more general analysis of many multiobjective problems.

Considerable attention has also been paid to a presentation of hybrid evolutionary algorithms, such as memetic algorithms, which have emerged as a very promising tool for solving many real-world problems in a multitude of areas of science and technology. Moreover, parallel evolutionary combinatorial optimization has been presented.

Search operators, which are crucial in all kinds of evolutionary algorithms, have been prudently analyzed. This analysis was followed by a thorough analysis of various issues involved in stochastic local search algorithms.

An interesting survey of various technological and industrial applications in mechanical engineering and design has been provided. Then, an account of the use of evolutionary combinatorial optimization in bioinformatics is given.

An analysis of a synergistic integration of metaheuristics, notably evolutionary computation, and constraint satisfaction, constraint programming, graph coloring, tree decomposition, and similar relevant problems completes the part.

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